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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/577,429	04/27/2006	Do-Hyung Kim	P0777	4724
34610 7590 06/23/2010 KED & ASSOCIATES, LLP P.O. Box 221200 Chantilly, VA 20153-1200				
EXAMINER				
COX, ALEXIS K				
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3744				
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06/23/2010		PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/577,429

**Applicant(s)**

KIM, DO-HYUNG

**Examiner**

ALEXIS K. COX

**Art Unit**

3744

**Period for Reply** -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 06 April 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-38 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 2, 5, 6, 9-12, and 36-38 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SG-08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Interval Patent Application
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Drawings*

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Loprete et al (US Patent No. 6,591,621) in view of Suzuki et al (US Patent No. 4,505,600) and TaeDuk (US Patent No. 5,285,646) as informed by Hix et al (US Patent Application Publication No. 2003/0143083).

Regarding claim 2, Loprete et al discloses a method for controlling an operation of a compressor of a cooling system comprising varying a cooling capacity of the cooling system a compressor is installed in by controlling a rotation direction of the compressor (see column 4 lines 23-24) according to a load condition of the refrigerator, wherein the cooling capacity of the system increases when the compressor is rotated in

the first direction and decreases when the compressor is rotated in the second direction (see column 4 lines 38-44; see also lines 55-56). Loprete et al discloses the use of load matching for fewer and shorter defrost cycles (see column 26 lines 51-52). This must comprise a step in which when the temperature inside the refrigerator and a pre-set defrosting temperature are identical, a defrosting operation is performed, as otherwise it is not load-matching. Further, as the temperature inside the refrigerator is greater following a defrosting cycle and the compression ratio is greater when rotated in the first direction, rotating the compressor in the first direction when the defrosting operation is terminated is also part of load-matching. Further, the system of Loprete is controlled by a thermostat (228, see column 25 lines 13-17), and the thermostat cited is programmable; as it is digital, it must have some defined sampling period, because that is part of the conversion from analog to digital, and therefore it therefore would have been obvious to one of ordinary skill in the art at the time of the invention to assess required compressor settings at pre set time periods in order to cause the thermostat to function. Additionally, stopping the compressor and rotating it in the second direction following a defrost cycle would have been obvious to one or ordinary skill in the art at the time of the invention, as it is common knowledge that immediately after defrosting the temperature of the controlled area will often be in the appropriate temperature range of the lower cooling capacity to be needed, and the purpose of Loprete is to save money by reducing power consumption by offering a lower cooling capacity for the same compressor. It is noted that Loprete discloses the use of a two speed motor, instead of a continuously variable motor or inverter, to drive the compressor; it is further

noted that Loprete does not disclose the entry of modes by a user. TaeDuk explicitly discloses varying the speed of a compressor as part of the reversal process, in order to prevent noise and damage to the compressor (see abstract); TaeDuk also explicitly discloses the use of multiple modes (heating, cooling, defrost, figures 5 and seven). Hix et al explicitly discloses that in a two-stage reversing compressor, the start-up torque in the reversed mode may cause damage to a compressor (see paragraph [0004]). It therefore would have been obvious to one of ordinary skill in the art at the time of the invention to use the variable speed motor of TaeDuk to operate the compressor of Loprete in order to have both a greater variety of pressure ratios available and prevent damage to the compressor due to excessively speedy switching of directions.

It is further noted that Loprete does not disclose setting the operation range of a temperature sensor that senses a temperature inside the refrigerator according to the rotation direction of the compressor, and sensing the temperature inside the refrigerator according to the set operation range. Suzuki et al explicitly discloses a temperature sensor which can have the resolution and detected temperature range adjusted (see abstract). It would therefore have been obvious to one of ordinary skill in the art at the time of the invention to use the temperature sensor of Suzuki et al on the interior of the refrigerator of Loprete and TaeDuk as informed by Hix in order to permit a narrower range with better resolution to be monitored when the compressor was operating in the direction with a smaller compression capacity and therefore smaller refrigeration capacity, and a larger range with less fine resolution when the compressor was operating in the direction with a larger compression capacity and therefore larger

refrigeration capacity, in order to permit better fine control of the system without requiring multiple temperature sensors.

Regarding claims 5 and 6, regardless of which direction the compressor is rotated in it is according to the operation mode of the refrigerator. Loprete also explicitly discloses a current sensor (see column 22 lines 41-42), which is part of what is used to control the motor. Further, Loprete discloses the method step of turning off the compressor for a predetermined time period before running it in the reverse of the previous direction, so as not to damage the motor and waste energy (see column 22 lines 4-9). It is noted that Loprete does not explicitly disclose the current sensor to be part of the switching mechanism; however, it would have been obvious to one of ordinary skill in the art at the time of the invention to make the current sensor part of the switching means, as the purpose of Loprete is to provide for less expensive variable load refrigeration by reducing power use, and power varies directly as current., and this will result in a more accurate reduction in power use.

Regarding claims 9 and 10, it is noted that Loprete does not explicitly disclose the setting of an operation range of a temperature sensor for sensing the temperature inside the refrigerator according to the rotation direction of the compressor. However, it falls within the realm of common knowledge as mechanically expedient to calibrate sensors to the sensitivity most suited to the application at hand, and it would have been obvious to one of ordinary skill in the art at the time of the invention to program the thermostat of Loprete et al to have a higher sensitivity when running the compressor in reverse, as it would be less likely to inappropriately overreact at the slower potential rate

of change in temperature available from the lower capacity of the compressor. Further, the selection of the appropriate temperature ranges according to various system compressor capacities are a matter of routine experimentation, and therefore would have been obvious to one of ordinary skill in the art to implement in order to optimize the efficiency of the system.

Regarding claims 11 and 12, the examiner interprets the intent of the claims to be to set the amount of refrigerant required in the system according to the amount necessary when the compressor runs at the lower capacity. As it falls within the realm of common knowledge as mechanically expedient to avoid damage to systems by providing for the worst case scenario, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the appropriate amount of refrigerant for the largest reasonable requirement.

Regarding claim 36, it is noted that Loprete does not explicitly disclose the setting of the first and second pre-set temperatures to be set by the operator. However, it falls within the realm of common knowledge to permit user programming of a thermostat in order to permit timed temperature control of a home, and it would have been obvious to one of ordinary skill in the art at the time of the invention to use a user-programmable thermostat in the system of Loprete et al in order to permit timed temperature control of a refrigerator according to user-specific load patterns.

Regarding claims 37 and 38, it is noted that Loprete does not explicitly disclose the pre-set temperatures to be 4 and 6 degrees Celsius. However, as the target temperature to maintain is that of a refrigerator, to maintain freshness of food, it would

have been obvious to one of ordinary skill in the art at the time of the invention to set the pre-set temperatures at 4 and 6 degrees, as this is cold enough to slow decay while not so cold as to cause accidental freezing.

***Response to Arguments***

4. Applicant's arguments with respect to claims 2, 5, 6, 9-12, and 36-38 are have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Heibei et al (US Patent No. 4,927,594) and Greenhut (US Patent No. 4,044,362) both disclose systems with temperature sensors whose operating parameters may be adjusted.

***Conclusion***

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of



the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ALEXIS K. COX whose telephone number is (571)270-5530. The examiner can normally be reached on Monday through Thursday 9:00a.m. to 6:30p.m. EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frantz Jules or Cheryl Tyler can be reached on 571-272-6681. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/AKC/

/Frantz F. Jules/  
Supervisory Patent Examiner, Art Unit 3744